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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,997	07/30/2003	Hardayal Singh Gill	HIT1P034/HSJ9-2003-0163US	2300

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EXAMINER	
BERNATZ, KEVIN M	
ART UNIT	**PAPER NUMBER**
1773	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/631,997	GILL, HARDAYAL SINGH	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-31 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-7 and 9-31 is/are rejected.

7)☒ Claim(s) 8 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 30 July 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 7/30/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Examiner's Comments

1. Regarding the limitation(s) "nanoconstricted area" in claims 1 - 31, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that any "area" can be construed as the nanoconstricted area provided it encompasses part of the "pinned" and "free" layers in a magnetic sensing element.

Claim Objections

2. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 17, 18, 27 and 28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 17, 18, 27 and 28 recite limitations directed to portions of the third layer "in the free area", yet the base claims from which these claims depend from explicitly state that the third layer extends along the pinned area "but not into the free area". As such, one of ordinary skill in the art cannot readily discern the claimed subject matter because claims 17, 18, 27 and 28 appear to be further limiting an element which cannot exist per the base claims. For the purpose of evaluating the prior art, the Examiner has interpreted these claims such that the *magnetic* part of the third layer does not extend into the free area.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 – 7 and 9 – 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Zheng et al. (U.S. Patent App. No. 2004/0160708 A1).

Regarding claim 1, Zheng et al. disclose a magnetic head having a pinned area, a free area and a nanoconstricted area encompassing portions of the pinned and free areas (*see Figure I, below*), the head comprising a first layer of magnetic material (*Figure 1b, layer* 27) extending along the pinned and free areas, an AP coupling layer (*layer 28*) extending along the pinned area, and a third layer of magnetic material (*layer 25*), an active portion of the third layer extending along the pinned area but not along the free area, wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area and a portion of the nanoconstricted area encompassing the pinned area (*elements 51 and 52*).

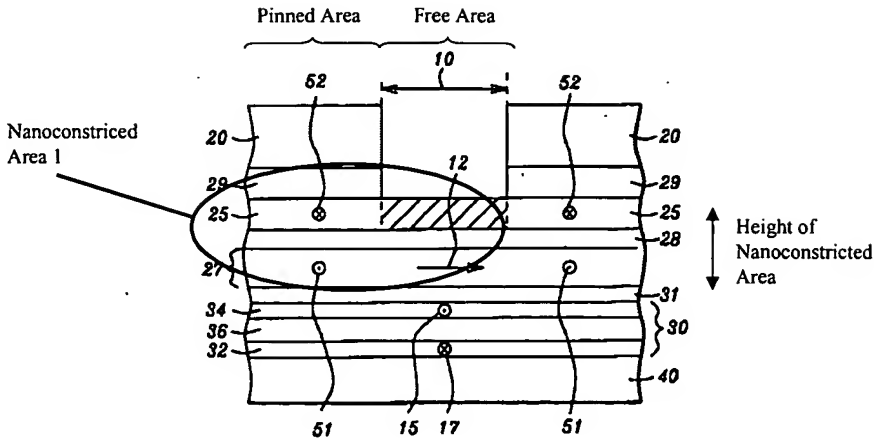

Figure I – Reproduction of Zheng et al. Figure 1b, showing Nanoconstricted Area

Regarding claims 12 and 22, Zheng et al. meets the claimed limitations simply by the Examiner shifting the circle above either to the left or to the right as what the Examiner is considering as the "nanoconstricted area" (*see Figure II, below*). I.e. claim 12 is met by "area" 2 and claim 22 is met by "area" 3.

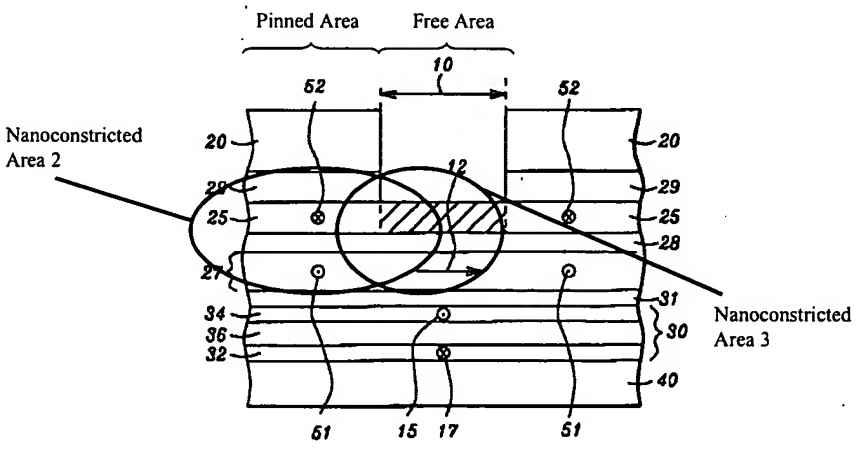

Figure II – Reproduction of Zheng et al. Figure 1b, showing different "areas"

Regarding claims 2 – 4, 13 – 15 and 23 – 25, Zheng et al. disclose a height (i.e. thickness of films 25 – 27) in the "nanoconstricted area" meeting applicants' claimed limitations (*Paragraphs 0020 and 0034*).

Regarding claims 6, 7, 17, 18, 27 and 28, Zheng et al. disclose a portion of the third layer (*layer 25*) being rendered nonmagnetic by oxidation (*Figure 1a, region 25b and Paragraph 0034*).

Regarding claims 9 – 11, 19 – 21 and 29 – 31, Zheng et al. disclose materials meeting applicants' claimed limitations (*Paragraphs 0020 and 0034*).

7. Claims 1 – 3, 5 – 7, 9 – 14, 16 – 24 and 26 – 31 are rejected under 35 U.S.C. 102(a) and/or (e) as being anticipated by Mack et al. (U.S. Patent No. 6,462,919 B1).

Regarding claim 1, Mack et al. disclose a magnetic head having a pinned area, a free area and a nanoconstricted area encompassing portions of the pinned and free areas (*see Figure III, below*), the head comprising a first layer of magnetic material (*Figure 6A, layer* 208) extending along the pinned and free areas, an AP coupling layer (*layer 206A*) extending along the pinned area, and a third layer of magnetic material (*layer 204A*), an active portion of the third layer extending along the pinned area but not along the free area, wherein the first and third layers have magnetic moments that are self-pinned antiparallel to each other in the pinned area and a portion of the nanoconstricted area encompassing the pinned area (*col. 8, lines 34 - 64*).

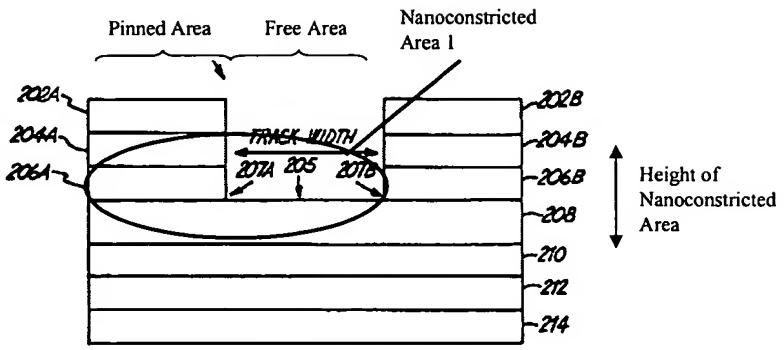

Figure III – Reproduction of Mack et al. Figure 6A, showing Nanoconstricted Area

Regarding claims 12 and 22, Mack et al. meets the claimed limitations simply by the Examiner shifting the circle above either to the left or to the right as what the Examiner is considering as the "nanoconstricted area" (*see Figure IV, below*). I.e. claim 12 is met by "area" 2 and claim 22 is met by "area" 3.

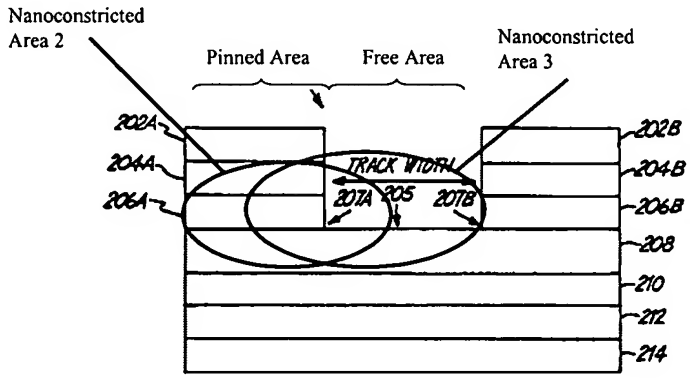

Figure IV – Reproduction of Mack et al. Figure 6A, showing different "areas"

Regarding claims 2, 3, 13. 14, 23 and 24, Mack et al. disclose a height (i.e. thickness of films 204A, 206A and 208) in the "nanoconstricted area" meeting applicants' claimed limitations (*col. 8, lines 34 - 64*).

Regarding claims 6, 7, 17, 18, 27 and 28, Mack et al. disclose a that instead of milling away the center portion of the exchange tabs as shown in Figure 6A, the center portion of the exchange tabs can be made non-magnetic via oxidation inorder to not exchange couple with layer 208 in the track width region (*col. 11, lines 37 – 60*).

Regarding claims 9 – 11, 19 – 21 and 29 – 31, Mack et al. disclose materials meeting applicants' claimed limitations (*col. 8, lines 34 – 64 and claim 5*).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 4, 15 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mack et al. as applied above, and further in view of Zheng et al. ('708 A1).

Mack et al. is relied upon as described above.

Mack et al. fail to disclose a height meeting applicants' claimed limitations.

However, Zheng et al. teach that the thickness of the free, non-magnetic and ferromagnetic exchange biasing layer can be controlled to meet applicants' claimed thickness limitations.

The Examiner deems that it would have been obvious to one having ordinary skill in the art to have determined the optimum value of a results effective variable such as the thickness of the layers through routine experimentation, especially given the

teaching in Zheng et al. regarding preferred thickness ranges for the various layers making up the "nanoconstricted area". *In re Boesch*, 205 USPQ 215 (CCPA 1980); *In re Geisler*, 116 F. 3d 1465, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997); *In re Aller*, 220 F.2d, 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Allowable Subject Matter

10. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record fails to teach or render obvious a magnetic head meeting applicants' claimed structural limitations in combination with "a hard bias layer positioned outside the free area for stabilizing the first layer in the free area".

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sharma (U.S. Patent No. 6,794,697 B1) teach a magnetic head having a first and second magnetic layer of different length reading on applicant's claimed limitations, but is not valid prior art since it was filed on October 1, 2003 (*entire disclosure including claims*). Beach (U.S. Patent App. No. 2004/0095690 A1) and Zhu (U.S. Patent No. 6,807,033 B2) teach similar subject matter to Zheng et al. and Mack et al. (*entire disclosures of both references*). Okuno et al. (U.S. Patent App. No. 2004/0169963 A1) teach the general concept of magnetic heads possessing nano-sized pathways for increasing the performance of the MR element, but fails to teach the

concept of a third layer having an active and inactive region (*entire disclosure, especially Figures*).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
January 7, 2005

Kevin M. Bernatz, PhD
Primary Examiner